

# Quick Revision Module

## (UPSC Prelims 2022) Geography



### COMPOSITION OF THE ATMOSPHERE

#### Gases



Constituent Gas	Percentage Volume
Nitrogen	78.08
Oxygen	20.95
Argon	0.93
Carbon dioxide	0.036
Neon	0.002
Helium	0.0005
Krypton	0.001
Xenon	0.00009
Hydrogen	0.00005

#### Water Vapour



- Account for 4% of the air by volume : In Tropics.
- Less than 1% of the air: In deserts and Polar Regions.
- Decreases from the equator towards the poles.
- Absorbs heat and prevents extreme temperatures on earth.
- Moisture holding capacity is directly proportional to temperature.

#### Dust Particles



- Higher concentration of dust particles: In subtropical and temperate regions. Reason: Dry winds.
- Provide the nuclei to water vapour to form clouds.
- Blue colour of the sky: due to scattering by dust particles.
- Duration of twilight: Affected by the presence of these dust particles in air.



### CHANGES IN ATMOSPHERE



#### AIR POLLUTION

- Acid rain** - Result of increased pollutants in the atmosphere.
- Two gases are the main culprits: Sulphur dioxide (forms sulphuric acid) and Nitrogen oxides (forms nitric acid). Harmful for plants, fishes, forests, building etc.



#### GLOBAL WARMING

- Major greenhouse gases** : Carbon dioxide, methane, nitrous oxide, water vapour and Ozone.
- SF6**: Most potent greenhouse gas in existence. Widely used in circuit breakers, gas-insulated substations etc.



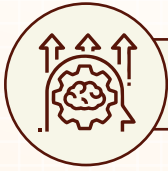
#### OZONE POLLUTION

- Ground-level ozone**: Sources
  - Hydrocarbons,
  - Small amounts of stratospheric ozone, occasionally migrate down to the earth's surface.
- Tropospheric ozone**: **Formation**: By the interaction of sunlight (UV), hydrocarbons and nitrogen oxides.
- Damages vegetation; destroys nylon & rubber; injures living tissue, causes respiratory problems.



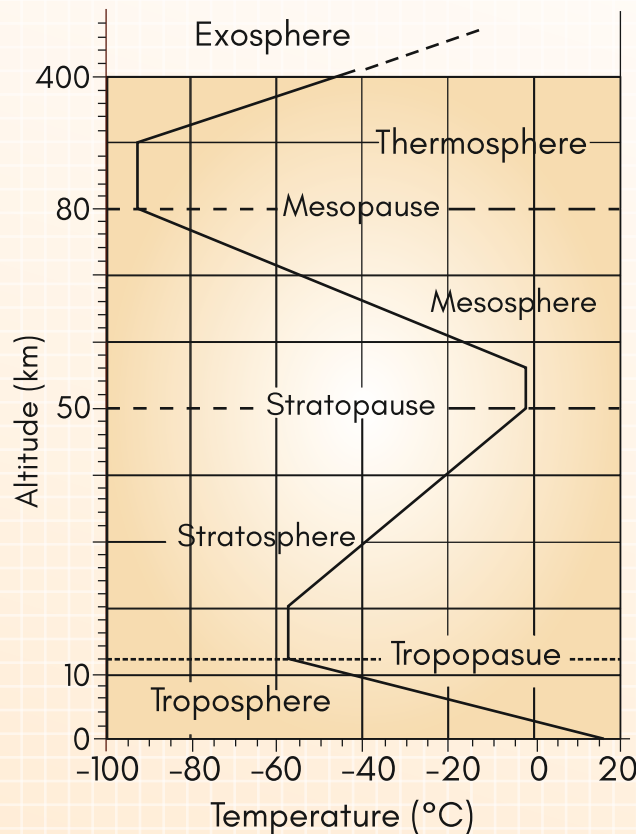
#### OZONE DEPLETION



- Caused due to release of chloro fluoro carbons (CFCs) .
- CFCs are widely used as cooling fluids in the refrigerating systems.
- CFCs are transported to Antarctica region** by atmospheric wind systems. Here, it get trapped in the Antarctica cold air by polar vortex and deplete ozone layer.






## STRUCTURE OF THE ATMOSPHERE

The atmosphere is divided into the five different layers depending upon the **temperature condition**. They are: troposphere, stratosphere, mesosphere, thermosphere and exosphere.



	Location & Height	Weather And Temperature Conditions	Significance
<b>Troposphere</b> 	<ul style="list-style-type: none"> <li>Lowermost layer of the atmosphere.</li> <li>Average height is 13 km and extends to a height of 8 km near the poles and about 18 km at the equator.</li> </ul>	<ul style="list-style-type: none"> <li>The temperature decreases at the rate of 1°C for every 165m of height.</li> <li>Lowest temperature found over the equator.</li> <li>All changes in climate and weather take place in this layer.</li> </ul>	
<b>Stratosphere</b> 	<ul style="list-style-type: none"> <li>Found above the tropopause and extends up to a height of 50 km.</li> <li>Having maximum concentration of ozone, called ozonosphere.</li> </ul>	<ul style="list-style-type: none"> <li>Free of any clouds and weather changes.</li> <li>Temperature increases during summers and decreases during winters.</li> </ul>	<ul style="list-style-type: none"> <li>Ideal place for flying of big planes.</li> </ul>



<b>Mesosphere</b> 	<ul style="list-style-type: none"> <li>Lies above the stratopause, and extends up to a height of 80 km from 50km.</li> </ul>	<ul style="list-style-type: none"> <li>Temperature decreases with the increase in altitude.</li> <li>Coldest layer in the atmosphere.</li> </ul>	
<b>Thermosphere</b> 	<ul style="list-style-type: none"> <li>Located between 80 and 400 km above the mesopause.</li> <li>Contains electrically charged particles and also called ionosphere.</li> <li>Ionization occurs mainly as a result of ultra-violet, x-rays and gamma radiations.</li> <li>Divided into different layers, D-layer, E-layer, F1 &amp; F2 layer and G-layer. D-layer &amp; E-layer, exist only during day time and vanishes as soon as sun sets.</li> </ul>	<ul style="list-style-type: none"> <li>Temperature increases rapidly with increase in height (upto 1500 deg C).</li> <li>Air is very thin.</li> </ul>	<ul style="list-style-type: none"> <li>Radio waves from the earth are reflected back to the earth.</li> <li>Protects the earth from meteorites and remains of abandoned satellites.</li> </ul>
<b>Exosphere</b> 	<ul style="list-style-type: none"> <li>Uppermost layer of the atmosphere above the thermosphere.</li> <li>Lies beyond 400km to 1000s of kms where it merges with outer space.</li> </ul>	<ul style="list-style-type: none"> <li>Temperature increases with height and may cross 5000 deg C.</li> <li>It is largely home to Helium and Hydrogen.</li> </ul>	



## STRATIFICATION OF ATMOSPHERE: ON THE BASIS OF CHEMICAL COMPOSITION

According to International Space Symposium 1962, atmosphere can be divided into two broad layers, namely **Homosphere** and **Heterosphere**.

PARAMETERS	LAYERS	
	HOMOSPHERE	HETEROSPHERE
<b>Extension</b>	Lower layer; extends up to 88km from the earth's surface.	Upper layer; extends beyond 88 km to more than 3500 km.
<b>Proportions of the component gases</b>	Uniform at different levels.	Non uniform in its composition.
<b>Sub divisions</b>	Troposphere, Stratosphere and Mesosphere.	Thermosphere.